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(54) Conveyor Belt Scraper

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**ABSTRACT OF THE INVENTION**

This invention provides a means to remove unwanted accumulated material from the inside surface of a conveyor belt, and comprises, in combination with a moving conveyor belt, a disc scraper adapted to be manually moved transversely across the inside of the belt to scrape off the unwanted material.

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**CONVEYOR BELT SCRAPER**

**M. WHALEY et al**

This invention relates to a cleaning device to remove unwanted material from the inside surface of a conveyor belt.

**BACKGROUND OF THE INVENTION**

In many materials handling operations, a conveyor belt is employed to move material from one place to another. In particular, the mining industry often uses such conveyor belts to move ore from the mine to transport devices (e.g. trucks or rail cars) or to a location where the ore is processed. In most cases, the material conveyed by the belt is a dry material, or, if wet, is not sticky and presents no problem for the conveyor belt operation.

In the mining of tar sands, the tar sand ore is conveyed by a moving belt from the mine area to a processing plant and it is during this operation that the sticky nature of the tar sands causes problems. During the tar sands mining operation when the tar sands are loaded onto the moving conveyor belt, and due also to the open bulk material handling, random amounts of tar sand fall onto the clean, inner side of the return belt. When the belt passes around the pulleys of the conveyor, the tar sand is compressed on the surface of the



belt and on the exterior of the conveyor pulleys. As this material builds up, it causes difficulties in maintaining the belt position on the conveyor, causes premature failure of the conveyor pulleys, and requires greater energy in the conveyor drive system.

**BRIEF DESCRIPTION OF THE INVENTION**

This invention provides a means to remove unwanted accumulated material from the normally clean inside surface of a conveyor belt, and comprises, in combination with the moving conveyor belt, a disc scraper adapted to move transversely across the inside of the belt and scrape off the unwanted material.

**PRIOR ART**

Scrapers for removing material from the conveying surface of a platform or conveyor belt are known and are exemplified by the disclosure of U. S. Patent 852,885 (1907) which describes a plow or scraper to remove earth from a moving platform. No art is known, however, which addresses the problem of cleaning the inside surface of the conveyor belt.

Attempts to remove the accumulated tar sands material on the inside of the conveyor belt have heretofore been unsatisfactory. For example, previously used devices similar to plows and scrapers have been very inefficient, leaving

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material remaining on the belt, and have resulted in tearing the belt. The device of this invention overcomes these drawbacks.

**DESCRIPTION OF DRAWINGS**

Figure 1 is a perspective view of the scraper device shown mounted above the lower return belt of a conveyor belt system.

Figure 2 is a front view of the device in an operating position.

Figure 3 is a plane view showing the scraper device above the lower belt.

Figure 4 is an end view of the device in operating position.

**DETAILED DESCRIPTION OF THE INVENTION**

Referring now to Figure 1, the scraper of the invention is comprised of a structural supporting frame (shown generally as 11) which is mounted over the return belt (13) of the belt conveyor which runs in the direction of the arrow between rollers (15). Tubular support legs (17) and footplates (19) of the frame (11) enable the device to be positioned over the return belt as desired. A yoke (21) at each end of the device supported by the legs (17) in turn supports a moveable frame (23) by means of screws (25) depending from yoke (21). The frame (23), in turn, supports pulleys (15) and slide bed (27) over which the belt (13) moves. The surface of the slide bed is preferably made of a rubber material denser than the conveyor belt to reduce the

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coefficient of friction between the two surfaces and to provide a wear resistant surface that the conveyor belt slide across. A suitable material is known as Ultra High Density Molecular Rubber. Screws (25) are turned by means of handles (29) to raise or lower slide bed (27) along vertical guide rods (31).

Also mounted on yokes (21) are horizontal guide rods (33) to support sliding carriages (35 and 35a). A transmission thread (37) is mounted between the yokes (21) and a nut (39) threaded on the transmission thread is welded or otherwise fastened to sliding carriage (35a).

Rotatably mounted between sliding carriages (35 and 35a) by means of supporting cross bars (41) and on axles (45) are one or more scraper blades (43), preferably in the shape of discs. Most preferably, two hollow dish discs will be used. The two scraper discs (43) are preferably positioned so that the scraper edges face away from each other, and preferably, each disc edge will also be at an angle of from about 20 degrees to about 50 degrees, preferably, from about 20 degrees to 45 degrees, from the edge of the conveyor belt which the disc is facing.

In operation, the slide bed (27) will be raised or lowered as shown by the arrows on frame (23) by turning handles (29). In this way, the moving conveyor belt is raised from its normal position so as to make contact with discs (43). On contacting the moving belt, discs (43) rotate and by turning handle (47) attached to the transmission

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thread (37) the discs are moved horizontally across the belt and any tar sands adhering thereto is peeled from the belt's surface and the rotary motion of the discs flings the material away from the conveyor .

.Figure 2 is a front view taken along Line 2-2 of Figure 4, showing the conveyor assembly in dashed lines; including the upper section of the conveyor belt (13A) which is supported by rollers (49) mounted on the conveyor structural frame assembly (51) that rests on a graded surface (53) of the excavated mining area. The tubular support legs (17) and footplates (19) are welded or otherwise fastened to the I-beams (55) which are fastened to the pontoon (57) which also supports the conveyor structural frame (51).

Figure 3 is a plane view which shows in detail the angular arrangement of the discs (43).

Figure 4 is an end view of the scraper in an operating position with the disc (43) touching the belt (13) so that the adhered tar sand can be removed.

The operation of this device is a manual process that requires the conveyor operator to raise the conveyor belt with the slide bed to bring the belt in contact with the discs. The movement of the conveyor belt causes the discs to instantly begin rotating on contact which prevents the knife-like edge of the disc from tearing the belt or causing premature wear. The rotation of the discs, effected by belt contact, is simultaneous with the starting and stopping of the belt and, therefore, the system provides continual

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cleaning during conveyor operation. The cleaning operation is controlled by the conveyor operator through manual operation of the disc assembly across the width of the belt. The conveyor operator can slowly advance and withdraw the discs across the belt over any area having tar sands compacted thereon and can move the discs more rapidly on the cleaner areas of the belt.

Continued use of this device effectively prevents the build-up of compacted tar sands on the inner surface of the belt and also prevents build-up of tar sands on the conveyor belt pulleys which, as explained above, causes difficulties with the conveyor system.

The angular offset and rotation of the discs during use also provide another benefit in that the material peeled from the belt is thrown away from the conveyor belt system by about 2 to 4 feet. These discharged tar sands build up over a period of time and are removed by conventional bulldozers without the hazards attendant to working near the belt system. Thus, the bulldozers operate in a safe manner without the likelihood of damaging the structural assembly of the conveyor belt which would cause work stoppages and raise production costs of the plant.

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## CLAIMS

1. A scraping device for removing unwanted material from the inside surface of a moving conveyor belt which comprises a structural, supporting frame, means on said frame to support a slide bed over which the return belt of said conveyor moves, means for vertically adjusting said slide bed, a horizontally sliding carriage mounted on said supporting frame, means to horizontally move said sliding carriage, and at least one scraping disc rotatably mounted on said carriage at an angle of about 20 degrees to about 50 degrees from the edge of said conveyor belt whereby when said slide bed is raised so that said moving belt contacts scraping disc the inside surface of said belt, any accumulated material is scraped therefrom.

2. The scraping device of Claim 1 wherein two rotatably mounted discs are mounted on said carriage at an angle of from about 20 degrees to 45 degrees.

3. A scraping device for removing unwanted material from the inside surface of a moving conveyor belt which comprises a structural supporting frame adapted to be placed over the return portion of said belt, said supporting frame comprising legs supporting a yoke having vertical guide rods and a vertical screw with a handle at one end to support a slide bed positioned beneath said return belt, horizontal guide rods mounted between said yokes which support a sliding

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carriage on each of said guide rods, at least one scraping disc rotatably mounted between said carriages by means of cross bars, said disc being a hollow dish disc positioned so that its scraper edge is at an angle of from about 20 degrees to about 50 degrees from the edge of the conveyor belt which the disc is facing, and a horizontal transmission thread having a handle at at least one end, said thread being fastened to one of said sliding carriages, whereby, when the handle on said vertical screw is turned the slide bed may be raised or lowered and when the handle on the horizontal transmission thread is turned, the slide bed is moved horizontally.

4. The device of Claim 3 wherein two discs are rotatably mounted between said sliding carriage at an angle of from about 20 degrees to about 45 degrees.

5. The device of Claim 4 wherein the surface of said slide bed facing said conveyor belt is made of a hard rubber having a density greater than said conveyor belt.

6. A process for removing unwanted material from the inside surface of a moving conveyor belt which comprises mounting a scraping device over the inside surface of said belt, said device being comprised of a structural supporting frame, means on said frame to support a slide bed over which the return belt of said conveyor moves, means for vertically adjusting said slide bed on said supporting frame a horizontally sliding carriage mounted on said supporting frame, means to horizontally move said sliding carriage and

at least one scraping disc rotatably mounted on said carriage at an angle of about 20 degrees to about 50 degrees from the edge of said conveyor belt, raising said slide bed until said disc contacts said moving belt and moving said discs horizontally to remove any accumulated material on said belt.

7. The process of Claim 6 wherein two scraping discs are mounted on said carriage.

8. The process of Claim 7 wherein the material removed from said belt is accumulated tar sands.

9. A process for removing unwanted material from the inside surface of a moving conveyor belt which comprises mounting a scraper device over the inside surface of said belt, said device being comprised of structural supporting frame, said supporting frame comprising legs supporting a yoke at each end of said frame, each yoke having vertical guide rods and a vertical screw with a handle at each one end to support a slide bed positioned beneath said return belt, horizontal guide rods mounted between said yokes which support a sliding carriage on each of said guide rods, at least one scraping disc rotatably mounted between said carriages by means of cross bars, said disc being a hollow dish disc positioned so that its scraper edge is at an angle of from about 20 degrees to about 50 degrees from the edge of the conveyor belt which the disc is facing, and a horizontal transmission thread having a handle at at least one end, said thread being fastened to one of said sliding carriages, turning the handle on said vertical screw to bring the

sliding carriage in contact with said moving return belt and the scraping disc in contact with the inside surface of said return belt and moving said disc horizontally by means of the handle on said transmission rod to remove any accumulated material on said belt.

10. The process of Claim 9 wherein two discs are mounted between said sliding carriage at an angle of from about 20 degrees to about 45 degrees.

11. The process of any one of claims 6, 7, 8 or 9 wherein material removed is accumulated tar sands.

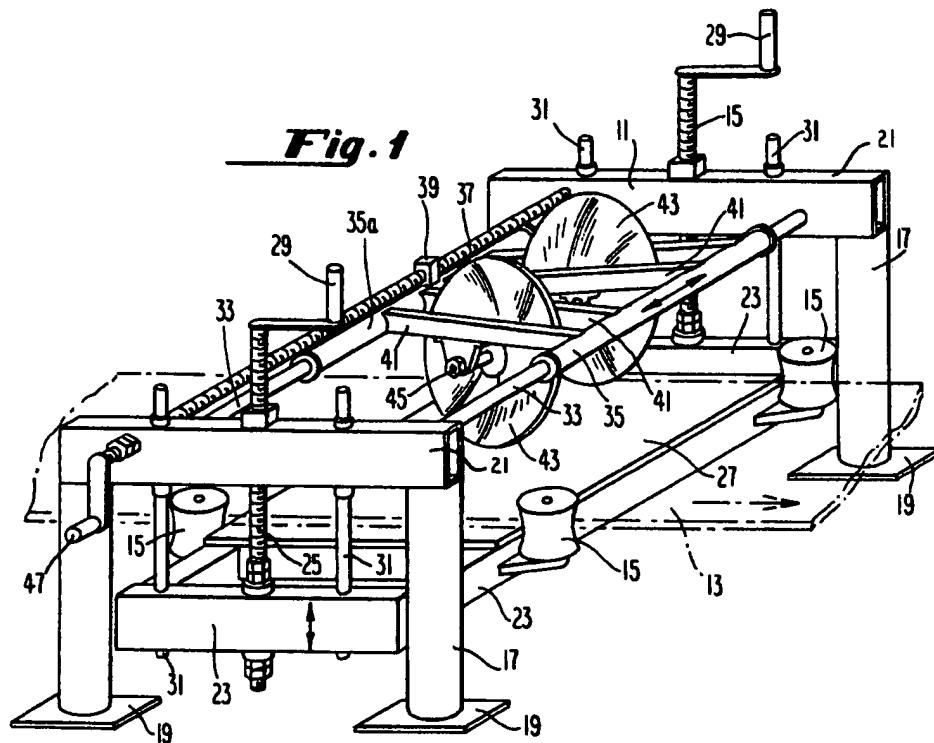
12. The process of any one of claims 6, 7, 8, 9 or 10 wherein the surface of said slide bed contacting said conveyor belt is made of a hard rubber material which is denser than said conveyor belt.



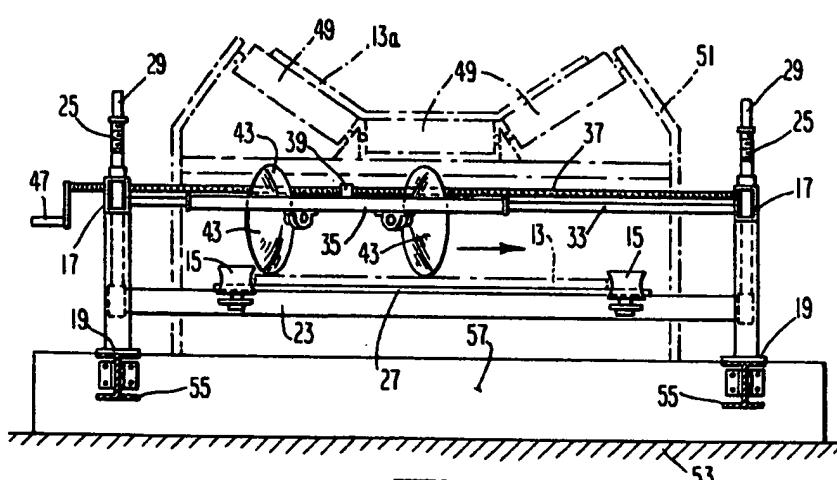
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**Fig. 1**



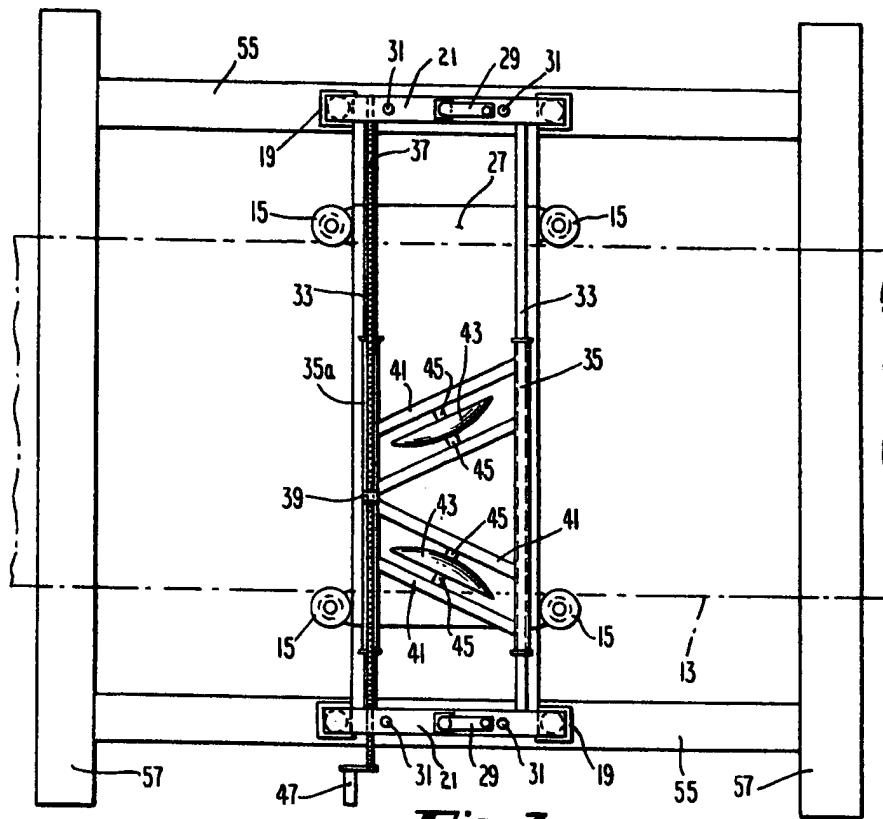
**Fig. 2**



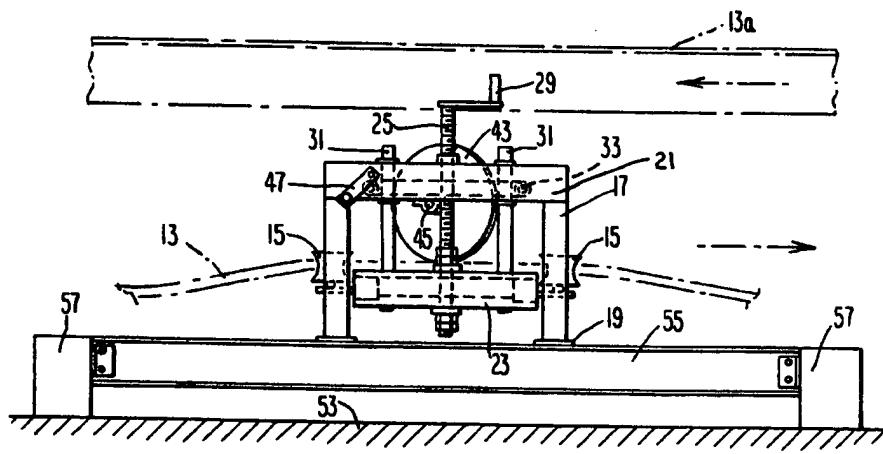
*Gowling & Henderson*

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***Fig. 3***



***Fig. 4***

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